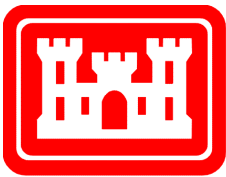


**QUILLAYUTE NAVIGATION PROJECT
ENVIRONMENTAL ASSESSMENT
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON**



**US Army Corps
of Engineers®**
Seattle District

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1. INTRODUCTION

This Environmental Assessment (EA) has been prepared for two reasons. The first reason is to evaluate the impacts that routine maintenance dredging and emergency repairs have had on the estuary that encompasses the Quillayute Navigation Project located at La Push, Washington. This project and town are situated within the boundaries of the Quileute Reservation. Some of the processes that are part of the project potentially affect lands on Olympic National Park Lands at Rialto Beach. To accomplish this evaluation all studies that were used for the Final Environmental Impact Statement of February 1986 were replicated as close as possible in 2001 and 2002. This EA will attempt to quantify and qualify any impacts that are directly the result of dredging and emergency repairs to the Quillayute Navigational Project. If impacts are identified during this evaluation the Corps will not suggest mitigation or solutions at this time. The Corps would like to activate the environmental work group that consists of Quileute Tribal Council and Natural Resources Department, Environmental Protection Agency (EPA), Washington Department of Fish and Wildlife (WDFW), Olympic National Park (ONP) and the U.S. Army Corps of Engineers, Seattle District to evaluate the findings of this EA and make recommendations based on those findings. Both of these studies encompassed more area than the project covers in an attempt to provide an overall picture of the estuary.

The second reason for preparing this EA is to project the future maintenance of this project over the next six years and to identify any potential areas that may require emergency repairs if routine maintenance is not accomplished as scheduled.

1.2 BACKGROUND

Maintenance of the project commenced in 1932 and has continued to the present. The project as it currently exists was developed in 1962. The purpose of this maintenance was to protect the navigational channel and the community of La Push. Please see section 2.0 Proposed Action for additional details. Figure 1, shows the project broken into major components and the following synopsis is a historical overview of each component:

- Upper Spit. Review of aerial photographs from 1976 and historical documentation contained in the Final Environmental Impact Statement of 1986 indicates this area consisted of sand, small gravel and sporadic vegetation; in other words a coastal beach habitat. The upper spit breached in 1954 and 1955 and was repaired with sand. During the 1960's large drift logs were cabled together and beach material was relocated to low spots in the upper spit to prevent future breaches. During annual maintenance in the 1960's dredged material from the boat basin (coarse sand and gravel) in the average amount of 50,000 cubic yards (c.y.) was placed on the upper spit as a method of beach nourishment but was insufficient to maintain the spit.

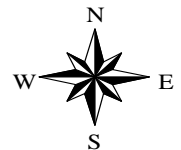


Figure 1 1976 Aerial Photo Quillayute

In 1971, 300,000 c.y. of sand, heavy gravel, and cobbles were dredged from the river and deposited on the ocean side of the upper spit. The Corps started a monitoring program to determine the rate of erosion of this material. By September 1974 the spit had lost virtually all of the 300,000 c.y. of material placed in 1971 or a rate of erosion of approximately 100,000 c.y. per year. To reduce the growing expense of repairing the spit in general 50,000 tons of 10 to 1,000 pound rocks were placed along the middle 1,600 feet of the spit. Then in 1978-1979 an additional 90,000 tons of the 10 to 1,000 pound rocks were placed on the spit. This was considered an interim repair that would give an additional 4 to 5 years of protection. In 1982, the Corps added 56,000 tons of spalls and larger armor rock on the spit to extend the protection longer than the estimated 4 or 5 years. Between 1982 and 1996 the Corps placed dredged material on the spit to maintain the portion of the spit that had not been armor rock.

Then on January 16, 1996 along the 1800 foot long natural sand spit located to the north of the area that had been revetted in 1982 an 800 foot breach occurred Figure 2. In August of 1996 205,000 tons of armor rock was placed along a 1900-foot section of the spit to close the breach and bring the revetment to a

height of +20 MLLW. Part of this work also included a permanent launched toe on the riverside to prevent undermining of the revetment by river currents.



Figure 2. Quillayute Aerial Photo 1996

- Lower Spit. This portion of the project maintained sufficient height to protect the project until 1976 and December 1979 and again in December 1980 when extreme river discharges eroded much of the spit. Berms were constructed in 1976 and 1980 by removing material from the wide areas of the spit to bring the lower spit to a height sufficient to provide protection to the project. Material from maintenance dredging was placed on the lower spit in February and March 1981 and was partially successful. But the lower spit was still lower than pre-berm conditions. Later in 1981 39,000 tons of armor rock and spalls were placed on the lower spit as the natural lower spit no longer provided protection to the project.
- Jetty. The jetty has functioned well since its authorization to height in 1958. Minor repair has occurred in 1979, 1982, and 2000.
- Boat Basin and Training Wall. The boat basin was constructed in 1957 and was routinely dredged every 10 to 15 years. In 1982 approximately 52,000 CY of material were removed from the basin. The training wall was constructed in 1962-1963 to prevent bedload shoaling of the boat basin.
- Navigation Channel and Disposal Sites. The channel from the boat basin to north end of the jetty is usually dredged every other year. The upstream reach to Smith Slough has not been dredged since 1971 due to very high shoaling rates, which occur in the upstream reaches of the estuary. Along the jetty, the channel is partially self-maintaining with the exception of the entrance to the channel. The average semi-annual dredging volume is approximately 100,000 CY.

Since 1978 the following quantities have been dredged from the channel: 1981-27,000 CY were removed and placed on the lower spit; 1984 – 67,000 CY were dredged with 37,000 placed on the central spit and 30,000 CY placed upland just west of Quillayute Street¹ within the town of La Push. In 1981 and 1984, the channel could not be dredged to authorize dimensions due to severe river and ocean conditions, the size of the dredging equipment and the limited winter dredging window. In 1985 about 88,000 CY were hydraulically dredged with 58,000 CY placed on the central area of the spit and 30,000 CY placed on the upland site. More recent maintenance dredging has occurred in September-November 1996, January-February 1997, February-March 1998, and September-November 1999. Prior to the breach the channel was dredged every other year, after the breach it was determined the Corps would have to dredge every year for a while before we could return to pre-breach conditions. By the completion of the 1999-2000 maintenance year material that had been introduced in the channel as a result of the breach had been removed. No dredging occurred in the 2000-2001 season. Dredging again occurred in the 2003-2004-maintenance cycle with 28,832 CY of material removed. There were 5,000 CY of material placed at the

¹ Name at that time and has since changed to Main Street

upland disposal site and 23,832 CY of material placed on the ocean side of the spit. In October of 2003 (Fiscal Year 2004) 5,000 CY of material were dredged from the mouth of the river and all was placed on the upland designated disposal site.

- **Dike.** In 1986 the dike extending upstream from James Island was in relatively good condition. As of today the dike is in poor condition. Since raising the jetty in 1962 to the authorized height the dike has contributed very little functionally in channelizing river flow and maintaining the channel, mainly because of the low height and the over topping of ocean waves. Future rehabilitation of this feature was not planned based on that synopsis. However, the dike does provide protection to the shoreline between the jetty and the first structure on the riverbank in La Push. Due to the poor condition of the dike a portion of the shoreline near the fish processing facility had to be emergency repaired in 2003 to stop further erosion into a sewer pipeline. Therefore, rehabilitation is planned in the future to bring the dike back to the authorized height for shoreline protection.

1.3 Authority and Purpose

The Quillayute River Navigation Project was authorized by the River and Harbor Act of 3 July 1930 and modified by the River and Harbor Acts of 2 March 1945 and 3 September 1954.

The purpose of the project is to provide and maintain depth within the small boat basin at the town of La Push and maintain passage from the boat basin to the Pacific Ocean while maintaining the spit that protects the channel and boat basin. This harbor of refuge has the only Coast Guard search and rescue station along 100 miles of coast between Grays Harbor and Neah Bay. The Quileute Reservation where the project occurs offers livelihood for approximately 300 Quileute Tribal members (fishing) and approximately 50 non-Indians, including Tribal staff, businesses, and Coast Guard personnel.

1.4 Project Description

Specific features of the current project include:

- (1) A small boat basin 1,070 feet long, 313 feet wide and 10 feet deep, with a 1,500 foot timber training wall constructed to elevation +16 feet MLLW along the west side to reduce shoaling inside the boat basin and a timber breakwater at the downstream end to protect against wave attack;
- (2) A rubblemound dike 8 feet above MLLW with a crest width of 14 feet and 1,050 feet in length along the west side of the river between Quillayute Spit and James Island (the dike included four optional rock groins which have not been constructed);

- (3) A navigation channel 100 feet wide and 10 feet deep from deep water opposite James Island up the Quillayute River to the small boat basin (approximately 2,400 feet), then 75 feet wide and 10 feet deep, extending another 1,900 feet further upstream to the mouth of Smith Slough;
- (4) Maintenance of Quillayute Spit, once a naturally occurring spit and now a revetted artificially maintained spit approximately 3,400 feet in length along the west bank of the Quillayute River extending northerly from the dike between James Island and Rock Islands to the Olympic National Park Boundary.

2. PROPOSED PROJECT

This portion of the EA will address current dredging methods since the FEIS of 1986 dredging processes have been changed to match the thalweg of the river as that has changed since the publication of the FEIS. The biggest change in methods is not using a backhoe to dredge that portion of the channel that was nearest the retaining wall prior to 1986. Since then the thalweg of the river has shifted and the river has removed that material from the channel. The movement of the thalweg will be addressed later in the existing environment sections of this EA.

Currently the Corps dredges the navigational channel and boat basin every other year. The main method of dredging is the pipeline dredge, with the majority of the material placed on the ocean side of the spit near its center to enhance the ocean side of the spit. Up to 30,000 CY of dredged material has been placed at the designated upland disposal site for beneficial use by the Quileute Tribe. When practical a clamshell dredge is used to dredge the mouth of the Quillayute River if shoaling begins to block or hinder entrance into the channel. Continued maintenance of the dike, jetty, and spit along with maintenance of the navigation channel are all current requirements placed on the Corps to maintain the Quillayute Navigational Channel. Current maintenance of the project that will be required over the next six years are continued maintenance dredging of the navigation channel (using current methods) and the repair of the dike. The jetty and spit are in good condition now and should remain in relatively good condition for the next six years.

Alternatives were investigated in the FEIS of 1986 and are hereby included as reference. If no action were to occur on the Quillayute River Navigation Project the river would shoal in along with the boat basin making them non-navigable; not only to the Quileute Tribe, boaters in harms way but also to the Coast Guard search and rescue vessels.

3. ENVIRONMENT IN 1986

Since the main purpose of this EA is to evaluate the effects of routine maintenance dredging and emergency repairs to the Quillayute Navigation Project this section will reflect the environmental conditions of the FEIS of 1986.

3.1 Hydrology and Geology 1986

The Quillayute River drainage basin lies within the northwest corner of the Olympic Mountain Range. The basin is composed of old sandstones and conglomerates, and a broad upland surface, which is underlain by Pleistocene marine sands, silts, and gravels, and mantled by glacial outwash. Because of these sources of material, the river transports a moderate bedload of gravel and cobbles during flood stages and a moderate bedload of sand and fine gravel during low flow stages. Bedrock headlands to the south are tertiary sandstones, conglomerates, and shale constantly under attack by the sea, providing sand, gravel, and cobbles for down drift beach nourishment.

The Quillayute is formed by the confluence of the Sol Duc and Bogachiel Rivers, both of which rise in the Olympic Mountains about 20 miles southwest of Port Angeles and flow in a generally westerly direction for a distance of some 40 miles. The Calawah River arises in the same general region and joins the Bogachiel about 7 miles above the latter's confluence with the Sol Duc. All three rivers have at times over the past 100 years according to the United States Geological Survey flow stations exceeded 20,000 cubic feet per second during storm events. As they flow into or form the Quillayute River (no flow gauge) one would speculate the flow would be at least 20,000 cubic feet per second for the Quillayute.

The Quillayute River flows westerly for about 5 miles from the junction of the Sol Duc and Bogachiel. About 4 ½ miles from its source, in Mora, the Dickey River joins it from the north, about half a mile below Mora; the river is deflected southward for the last mile of its 6-mile course by a revetment that separates it from the ocean. It enters the ocean at the north end of Quillayute Bay, just east of a group of four rocky islands. Historically the thalweg of the Quillayute River has meandered within the confinements of the estuary resulting in historically different locations of the main channel.

3.2 Ecology 1986

Investigation of the habitat types was conducted and printed on 31 July 1981 for use in the FEIS of 1986. Main topics from that printing will be presented here and the more minut details are here by incorporated as reference to that printing and are available upon request.

Twelve wetland and nine upland habitat types were identified within the study area and six major urban land uses were noted. The major wetland types included wet meadows; overflow forest, low tide shores, and low tide bars and flats. The most abundant habitat types were estuarine zones, mixed forest, commercial/service/industrial regions, and residential areas. Using today's definition of estuarine zones we will combine the low tide shores, low tide bars and flats into the estuarine type habitat. Since we are only looking for potential impacts that pertain to maintenance dredging and emergency repairs

of jetties, dikes, and spits we will address the estuarine conditions as of 1986. Estuary will be defined as all water sources and associated habitat (riparian zone) with the Quillayute River.

Prior to 1974 the spit (combine upper and lower) as pictured in Figure 1, consisted of coastal beach and beach grassland/shrub habitat. In 1981 when this evaluation was completed the spit consisted of the same with a loss of the middle 1600 feet that were armor-rocked to prevent breaching and reduce cost of maintenance. The eastern boundary of the navigation channel consists of urban habitat. Past the marina or beginning at Smith Slough we encounter a more estuarine habitat with mixed forest, maritime forest, sand bars and flats and sedge meadows.

3.3 Water Quality 1986

Water of the Quillayute River is classified as AA, extraordinary by the Washington State Department of Ecology. Aside from logging, the upper Quillayute Basin is relatively unaffected by human activity which might affect water quality. The water quality study performed in 1981 showed a normal salinity gradient throughout the estuary at high and low tides. The turbidity level was generally higher at the bottom than at the surface and was usually higher during windy conditions. Dissolved Oxygen (DO) levels were higher during high tides than at low tides in the estuary. DO levels were generally lower in the boat basin than other areas of the estuary.

3.4 Vegetation 1986

The spit has very little vegetation and the jetty has no upland vegetation. The remaining areas around the project area are mostly urban or residential in nature and have very little vegetation. A mixed forest, consisting mostly of Sitka spruce (*Picea sitchensis*), alder (*Alnus rubra*), and an occasional hemlock (*Tsuga canadensis*), surrounds the eastern side of the town. A wide variety of shrubs or understory vegetation includes salmonberry (*Rubus spectabilis*), twinberry (*Lonicera involucrata*), blackberry (*Rubus villosus*), elderberry (*Sambucus nigra*), sword fern (*Nephrolepis cordifolia*), wood sorrel (*Oxalis stricta*), etc. Behind First Beach is a coniferous forest consisting almost entirely of Sitka spruce with an occasional hemlock and alder. Dune grass (*Ammophila breviligulata*), yarrow (*Achillea millefolium*), vetch (*Vicia villosa*) and goldenrod (*Solidago virgaurea*) are abundant in the narrow zone of beach grassland immediately above the beach drift logs on First Beach.

Wetlands exist in the general project area, just upstream of the marina. These include brackish deep and shallow marshes characterized by the sedge (*Carex lyngbyei*) in the lower regions, with a mixed sedge/silverweed (*Potentilla pacifica*) community immediately above it. Several sloughs enter the river on the left bank, which are often bare and exposed at low tide and carry little if any freshwater runoff. Wet meadows are also found upstream of the project, with grasses and herbs, especially silverweed and

redtop, being most common. In small areas on the right bank, canary grass (*Phalaris arundinacea*) is present, with alder and blackberry. Brackish shrub swamps, dominated by willows, and wet maritime forest, containing spruce and alder and sedges are also found.

3.5 Fish 1986

Chinook (*Oncorhynchus tshawytscha*) is the most important fishery species for the Quileute Tribe. The greatest number of young was found between May and September and the least were found in the winter. The Quillayute River supports four other species: Coho (*O. kisutch*); chum (*O. keta*); pink (*O. gorbuscha*); and sockeye (*O. nerka*). The study that was conducted in 1979 was used for the report of fisheries within the FEIS of 1986. This study found Chinook, coho, chum and sockeye along with two species of trout, steelhead (*Salmo gairdneri*) and cutthroat (*Salmo clarki*).

Food habitats of juvenile salmonids were investigated by stomach analysis; all Chinook and almost all coho contained prey organisms. *Plecoptera* (stonefly) nymphs were found in 92 percent of the stomachs and adult *Chironomids* (midges) were found in 62 percent of the stomachs. Overall, the most important prey taxa for these species were fish eggs, chironomids, calanoid copepods, and gammarid amphipods.

The stomach analysis report by Simenstad and Buechner, (1979) indicate that ample food was available for the salmonids species. Diel variation in Chinook prey composition and feeding intensity was evident and could be related to tidal influence upon the distribution and abundance of the various riverine, estuarine, and marine prey. Chironomids appeared to be consumed by juvenile Chinook during periods of low tides while estuarine gammarid amphipods and isopods were appeared to be fed upon during periods of high or flooding tides.

Coho which were larger feed principally on fish eggs, larvae, calanoid copepods, and gammarid amphipods with the later being of the marine form. This type of behavior does compare to other estuaries within Washington State.

3.6 Smelt 1986

Two distinct sizes of surf smelt (*Hypomesus pretiosus*) were found in the estuary (60-100mm and 120-250 mm), possibly representing one year old and 2-3 year old age classes. Usage of the estuary peaked once in June and again in July. The 24-hour seining study indicated the largest numbers of fish are in the estuary during mid and higher high tides. During the periods sampled, surf smelt were the fish most commonly found in the estuary, especially at high tides. The majority of smelt were caught in the lower and mid estuary.

3.7 Wildlife 1986

Marine and land mammals were surveyed during this study; however, most of the information presented is based on literature review and discussions with local biologist and residents. The only marine mammal sighted was a harbor seal (*Phoca vitulina*) sighted near the confluence of the Dickey and Quillayute Rivers. Harbor seals and California sea lions (*Zalophus californianus*) are commonly observed in the estuary. Other marine mammals occasionally seen in the area are Steller's sea lion (*Eumetopias jubata*), northern fur seal (*Phocoena vomerina*), piked whale (*Balaenoptera acutorostrata*), Pacific right whale (*Eubalaena sieboldi*), humpbacked whale (*Megaptera novaeangliae*), and sea otter (*Enhydra lutris*).

Based on local observations land mammals observed in the area are: 17 horses that have modified the wetlands area to the extent that survival of large mammals would be extremely hard, however, elk (*Cervus canadensis*), black-tailed deer (*Odocoileus hemionus columbianus*) and black bear (*Ursus americanus*) were noted. A few small burrowing and arboreal mammals do thrive in this area from the Pacific mole (*Scapanus orarius*) to Townsend voles (*Microtus townsendi*). Midsized mammals from raccoon (*Procyon lotor*) to snowshoe hare (*Lepus americanus*) are fairly common in this area.

Most of the above species were noted in the wetlands and upland areas. The jetty and spit areas do not provide sufficient habitat to support the species listed above. No land mammals were noted on either the jetty or spit areas.

Birds were the most prevalent specie of wildlife found within the estuary. Fifty plus species of birds were observed during this study. The area of greatest surprise was the rock breakwater (dike) connecting James Island and the spit. Since the rocks are submerged most of the time and the area is somewhat sheltered from large waves this area provides habitat for numerous marine organisms. As a result this area is very attractive to shore birds during low tides when the rocks are exposed. This area actually attracted the largest number of shore birds during all three surveys. The area of the spit that had recently had dredged material disposed on had the most birds observed on the spit. Other than being used for perching the quarry spalls appears to have no benefit to bird species for any other use.

3.8 Threatened and Endangered Species in 1986

No plants on the Federal list of endangered and threatened wildlife and plants are found in the vicinity of the project. The National Marine Fisheries Service (NMFS) list seven whale species and a sea turtle that can be observed along Washington Coastal waters. The only species that appears regularly near the mouth of the Quillayute River is the gray whale (*Eschrichtius robustus*).

The bald eagle, a threatened species, and the Peale's peregrine falcon, then considered endangered due to its similarity to the endangered American Peregrine, are both found in the vicinity of the project. A peregrine eyrie has been known in the general vicinity of

the project area and is consistently monitored by the Washington Department of Fish and Wildlife (WDFW) and U.S. Fish and Wildlife Service. There are no active bald eagle nests within 4 miles of the project area. They are seen frequently flying overhead and often perch in snags on James Island.

3.9 Cultural and Native American Concerns 1986

An ethnohistoric survey of the area was conducted to determine potential effects of the project on cultural and religious sites of importance to the Quileute Tribe. A number of cultural resources sites were documented within the general vicinity of the project, but none are close enough to be affected by project operations and maintenance.

Sites were identified on the spit on the northwest side of the channel and on adjacent Rock and James Island. Part of Rock Island was removed some years ago when the jetty was originally constructed. The spit, reportedly used as a burial ground, has had an active geological history. It is regularly breached during winter storms and has been rebuilt a number of times with dredged material from the channel. Part of the spit is vegetated which suggests a stable surface. Testing in these locations did not reveal any evidence of cultural remains.

Given these considerations, it is unlikely that cultural materials would be discovered within the immediate vicinity of the project. Although there are a number of prehistoric and ethnohistoric sites in the general vicinity, there are no sites in the immediate vicinity, which have been determined eligible for, or are included on the National Register of Historic Places.

3.10 Land Use 1986

The Quileute Coastal Zone Management Plan was published in 1981. In it, the coastal zone is defined to include “all lands which are now, or in the future determined to be, within the exterior boundaries of the Quileute Indian Reservation.”

Land use activity classifications, which apply to the project, include marina and shoreline stabilization structures. The policy on marinas is “to limit the boat basin to its existing size and capacity. Any excavation, modification, or construction may serve only to replace existing structures or to clean up existing negative features such as bank slippage or pollution.” Policy on shoreline stabilization structures is that “no shoreline stabilization structure shall be allowed if it will adversely impact the river fisheries of the tribe and its members.” Guidelines for this policy also states, “Dredging of the navigation channel shall occur only between January 01 and March 31 of any year or they must be coordinated with and through the Quileute Tribal Fisheries and approved by the Quileute Tribal Council.”

3.11 Air Quality and Noise 1986

There are no significant sources of air pollution within the project area, and onshore winds disperse local emissions from residential and vehicular sources. Due to the cleansing effect of ocean storms and westerly winds, the air quality in the project area is so nearly pollution free that it constitutes a benchmark region.

3.12 Transportation 1986

The community of La Push is very small and is at the end of the road so there is no pass through traffic associated with the project or the vicinity. The transportation is only impacted during the mobilization and de-mobilization of the dredging equipment that usually consist of one day at each end. By keeping the navigation channel open this may draw non-tribal or sports fishery people to come to La Push and utilize the available Tribal resources to participate in the local fishery.

3.13 Socio-Economic 1986

The social and economic conditions on the Quileute Reservation are, in part, due to its remoteness. Development in the area has been inhibited due to high transportation costs. The primary justification for navigation improvements has been for supporting commercial and sports fishing operations; approximately 90 percent of the tribe's income is derived from fishing related activities. The rugged wilderness character of the area attracts travelers from throughout the northwest. The substantial income of the area realized from this tourist industry directly and indirectly benefits the Quileute Tribe, which owns some of the tourist facilities. Non-tribal members own others which the tribe generates revenue by leasing lots for these facilities.

3.14 Recreation 1986

Just prior to the FEIS there was a resort located across Smith Slough that was open for camping and fishing the Quillayute River and ocean. The resort was either abandoned or burned down just prior to the development of the FEIS. There is access to the area via a rundown wooden bridge that will eventually become impassable. Other opportunities include a few cabins located on the beach for rent to vacationers and bird watchers.

3.15 Aesthetics 1986

The spit is predominately a sandy (some vegetation) beach type habitat. This beach does provide some habitat for migratory birds and other small mammals that may find this habitat opportunistic. There is a spruce type habitat behind the beach and between the rental cabins that also contains bird and small mammal habitat.

4.0 EXISTING ENVIRONMENT 2003

In this section the Corps will present the current conditions of the estuary as of 2003. This section will evaluate the impacts that are directly related to maintenance of the navigation channel. There may be some areas that are not a direct effect of maintenance of the navigation channel but are an accumulation of outside impacts e.g., logging and land use practices for example. Those areas will be mentioned but the intent of this EA is to attempt to identify specific and or direct impacts to the estuary as a result of maintenance of the navigation channel.

The Corps will base this section on a habitat evaluation study using aerial photographic analysis in 2001 performed by Scientific Applications International Corporation (SAIC), and a comparative analysis of replicated studies also performed by SAIC. Those replicated studies included fish, crab, benthic and water quality analysis. Photos available for analysis were between the years 1976 and 1999. Although the analysis cannot be considered precise due to different tidal elevations when the photos were taken, the analysis will give a fair representation of the geology of the Quillayute Estuary and the changes that have occurred between 1976 and 1999. The replicated studies will provide the opportunity to compare the studies conducted in support of the FEIS of 1986.

4.1 Hydrology 2003

Review of the hydrological graphs provided by the U.S. Geological Survey from stations located on the Calawah, Bogachiel, Sol Duc, and Dickey Rivers that flow into the Quillayute River does not indicate that maintenance dredging has significantly changed the hydrology of the Quillayute River. However, it is apparent that hydrology has changed as the photos indicate a change in the thalweg location in the river. This change could be from logging and or land use further upstream of the navigation channel or just the natural attempt of the river to change. Plus the loss of material from the spit after protection measures were implemented to prevent future breaching of the spit, may have affected the thalweg.

This change in geology created a large island that has been cut away from the landmass just upstream from the harbor; while an island on the northern shore of the River has been significantly decreased in size (Figure 2). The meanders in the Quillayute River upstream of the confluence of the Dickey River have matured, creating more pronounced cut-banks and larger point bar deposits. Estuarine conditions appear to reach further upstream than they did in the 1979-80 study based on salinity values upstream.

4.2 Geology 2003

Along with the above changed conditions in the estuary a recreation area that was located across Smith Slough has closed and the area is returning to a more natural habitat that probably existed prior to that particular development. These events could be a partial explanation of the increase in Broadleaf Mixed Forest by approximately 12.1 acres.

The most significant changes in the estuary are a direct and indirect result of the maintenance of the navigation project. There is an estimated loss of Beach Grass/Shrub of approximately 3.4 acres and a loss of coastal beach of approximately 6.8 acres. The loss of approximately 2.8 acres of Sand Bars and Flats could also be the result of the change in the thalweg of the Quillayute River and could not be pinpointed to the navigation project solely.

Dredge material that has been placed on the ocean side of the spit apparently has not increased the size of the beach or any gravel type habitat because of the high level of coastal erosion. The material has replenished the beach during littoral drift to the north to enhance surf-smelt habitat that is located predominately on the Olympic National Park's Rialto Beach. However, this nourishment has not reduced the rate or extent of erosion that is occurring along the beach.

4.3 Water Quality 2003

A yearlong water quality study (no Dredging occurred) was conducted in 2001 and was designed to replicate the water quality studies that were accomplished in 1981 and presented in the 1986 FEIS. Due to the loss and gain of habitat and a change in the thalweg of the river some locations were moved to match as close as possible to the stations utilized in the 1986 FEIS.

DO readings ranged from 4.0 to 18.3 mg/l for the bottom of the water column during high tides and from 6.5 to 13.2 mg/l during low tides. In 1986 the range was 6.8 to 15.0 mg/l for bottom readings during high tides and 0 to 15.0 mg/l during low tides. Surface readings ranged from 6.4 mg/l to 14.4 mg/l during high tides and 6.1 mg/l to 13.5 mg/l during low tides. In 1981 the surface readings ranged from 0 to 14.0 mg/l during low tides and from 8.9 mg/l to 15.0 mg/l during high tides. The middle region ranged from 5.0 mg/l to 23.4 mg/l during low tides and from 4.8 mg/l to 34.9 mg/l during high tides. In 1981 the middle region ranged from 7.2 mg/l to 15.0 mg/l during high tides and 6.0 mg/l to 15.0 mg/l during low tides.

Although the numbers are a little different than in 1981, generally the DO levels were higher during high tides than at low tides in the estuary. DO levels were generally lower in the boat basin than other areas of the estuary. No impacts from navigational maintenance could be correlated to the DO levels.

There will be a minor and short-term disturbance to water quality during the dredging operation. The river flushes the turbidity out of the estuary rapidly.

4.4 Vegetation 2003

The spit is now void of vegetation since the breach occurred and riprap was placed on the entire length of the spit to stabilize the spit and reduce cost of maintenance. The

remaining areas around the project area are mostly urban or residential in nature and have very little vegetation. A mixed forest, consisting mostly of Sitka spruce, alder, and an occasional hemlock, surrounds the eastern side of the town.

The area behind First Beach has seen significant change in recent years. The Tribe has established new beach houses for rental purposes and that has resulted in the loss of a portion of the Sitka spruce community that was located in the area. Most of the natural vegetation has been removed and replaced with decorative shrubs. There is still a transition area between the beach and rental houses but this is smaller in size compared to 1981.

The following is a list of substantial changes in vegetation from 1976 to 1999 based on the aerial photo analysis. The acreage is provided as estimates due to the potential of tidal elevation influence on the measurements taken via the aerial photographs. However, those estimates will provide a working guideline as to the lost or gain of vegetation over this time period.

Beach Grass/Shrub 2003

This is a narrow zone typically beyond the beach drift logs dominated by dune grass (*Elymus mollis*), yarrow (*Achillea millefolium*), English plantain (*Plantago lanceolata*), tansy ragwort (*Senecio jacobaea*), and oxeye daisy (*Leucanthemum vulgare*). Other species present include goldenrod (*Solidago sp.*), vetch (*Cicia sp.*), hawksbeard (*Crepis sp.*), and everlasting (*Anaphalis margaritacea*). Beach grass/shrub is generally elevated above the beach grassland and the scrub zone appears to be an older successional zone usually on accreting sandy areas. Twinberry (*Lonicera involucrate*), salal (*Gaultheria shallon*), Sitka willow (*Salix sitchensis*) and young red alder (*Alnus rubra*) are common. There appears to be a loss of approximately 3.4 acres of this type habitat mainly beach grass. This partially a result of the placement of riprap on the spit and partially due to the change in the thalweg of the river as noted on Figure 2 and Figure 3.

Coastal Beach 2003

This habitat group includes the coastal beaches of Rialto Beach and First Beach, consisting of cobbles, gravels, and sand substrate. Coastal beaches are within the storm tide zone and large drift logs dominate the beach. There appears to be a loss of approximately 6.8 acres of coastal beach habitat. As depicted in Figure 2 and 3 there is some apparent loss of this type of habitat that was located on the spit but this could be influenced by the tidal differences shown in the aerial photos. This also could be the result of storm activity along this part of the coast. There appears to be no net loss along First Beach.

Sand Bars and Flats 2003

Bars and flats principally include the sand and gravel bars in the tidal portions of the Quillayute River and predominately unvegetated mud and sand bottoms exposed at low

tide. There is approximately a loss of 2.8 acres of this type of habitat. This appears to be a more direct result of the change in the thalweg of the river versus the maintenance and dredging of the project as indicated by the change in the thalweg between Figure 2 and 3.

Other areas that do not pertain to the maintenance of the navigation channel features directly are as follows with their estimated loss or gains in acreage:

Broadleaf Mixed Forest with an estimated gain of 12.1 acres;

Maritime Forest with an estimated loss of 4.7 acres;

Sedge Meadow with an estimated loss of 14.7 acres.

Areas that pertain directly to the maintenance of the navigation channel directly are as follows with their estimated loss or gains in acreage:

Gravel-cobble bars with an estimated gain of 3.6 acres;

Jetties/dike and Rocky habitat with an estimated gain of 7.6 acres.

4.5 Fish 2003

The majority of Chinook were caught between May and September with the most caught during the month of May. The same species of fish were caught during this study Chinook, Coho, Chum, Sockeye, Steelhead, and Cutthroat.

Reviewing the catch data provide by the Quileute Natural Resource Department, Chinook, Coho, and Steelhead fisheries were impacted by the breach that occurred in 1996. The breach made the Quillayute River apparently unfishable in areas thus resulting in extremely low numbers for their catch record. Since the repair the catch record has demonstrated a continual climb until 2003 when the numbers dipped again. There are so many different factors that can affect the health and survival of salmon during migration it would be almost impossible to point to one factor that was affecting the health of the salmon population. Availability of food source and or the stomach contents are the best means of looking for potential impacts that dredging could have on the health of the salmon population.

The stomach contents during this study consisted of amphipod (*Anisogammarus sp.*), (*Corophium sp.*), copepoda (*Harpacticoida*), mysidacea (*Neomysis mercedis*), insecta (*Diptera larva*), (*Chironomidae larvae*), isopoda (*Gnorimosphaeroma sp.*), decapoda (*Crangon sp.*), and teleostei (*Teleostei juvenile*). Again there appears to be ample food source for salmon species in the Quillayute River. Further examination of the results indicate there appears to be a shift from ocean-stage Chinook to stream-stage Chinook and this could be a result of the hatchery practices that have occurred over the past 20 years and a direct result of price reduction for salmon, which makes ocean fishery uneconomical.

4.6 Smelt 2003

Surf smelt were found to utilize the upper portion of the estuary during the period this study more so than in the 1979-80 study. This could be attributed to estuarine conditions reaching further upriver in 2002. For the 24-hour surveys in 1979-80, surf smelt were caught in higher densities during mid-high to high tides. In 2002, surf smelt were caught during low mid to low tides. The sampling site for the 24-hour surveys was unique in that during high tides a very shallow sandy bench was covered with water, and during low tides a deep trench in the main body of the river became accessible. This could explain why catches of surf smelt were higher during low tides in 2002. Overall the densities and size distributions were comparable.

4.7 Benthic 2003

In the 1979-80 survey, numerous taxa were found at stations located on First and Rialto Beach, where in 2002, samples from those areas found almost nothing. It is possible that wave action on these beaches during 2002 was higher than in 1979-80, and either deterred recruitment or wiped out most invertebrates in the intertidal zone. These areas are known to be highly dynamic, yet would recover quickly, as could have been the case in 1979-80.

Similar to the earlier study, the inner stations of the estuary contained much higher densities of organisms than the outer stations for 2002. Species of amphipod were prevalent within the estuary for both studies, as were *Oligochaete* sp., and several species of polychaetes. Bivalves recruited into the estuary in 2002, while in 1979-80 they were only found at James Island, outside the estuary. There may have been an increase in organic deposition within the estuary over time, which could eventually support recruitment of higher densities of organisms.

4.8 Wildlife 2003

The wildlife species observed in 2002 were fewer than observed in 1979-80 due mainly to only four habitat types observed in 2002 verses six habitat types observed in the 1979-80 study. The Sitka spruce uplands were not a part of this survey since the focus was within the navigation channel and disposal areas and we combined the other habitat area within the four discussed in this EA.

A total of 35 bird species were observed within the four habitat areas (Revetted Beach, Estuary/River, Developed areas, and the sea stacks). Of these habitat types 60 percent of the species was observed in the estuary, 17% was observed at the sea stacks, 20% observed on the revetted beach and 3% in the developed areas. The Peregrine Falcon was removed from the Threatened and Endangered list on August 25, 1999. Although Brown Pelicans were not observed during this survey they have been seen using the marina wall at various times of the year.

Harbor seals (*Phoca vitulina*) were sighted in the estuary in 2002 while none were sighted in the 1979-90 surveys. No other marine mammals were observed. During the survey a raccoon (*Procyon lotor*), Douglas (*Tamiasciurus douglasi*), and black-tailed deer (*Odocoileus hemionus*) were seen while none were observed in the 1979-80 survey. Sea lions although not observed during the survey have been seen by locals and frequent the area on regular basis.

4.9 Threatened and Endangered Species 2003

As in the 1979-80 survey no plants on the Federal list of endangered and threatened wildlife and plants are found in the vicinity of the project. The National Marine Fisheries Service (NMFS) list seven whale species and a sea turtle that can be observed along Washington Coastal waters. The only species that appears regularly near the mouth of the Quillayute River is the gray whale (*Eschrichtius robustus*).

The bald eagle was the only federally listed species observed during surveys. Bald eagles were commonly observed throughout all of the study area. Brown Pelicans were not observed but utilize the marina wall as a resting place various times of the year. Marbled murrelets are known to occur in the vicinity. No unusual concentrations of any bird species were seen during the surveys.

4.10 Cultural and Native American Concerns 2003

There are no changes known at this time with cultural resources.

4.11 Land Use 2003

The biggest change in land use is the recreational area that was located across Smith slough does not exist anymore and the land is reverting back to a more natural habitat. Additional structures have been built within the Tribal property but no structures have been built that would interfere with Tribal fisheries.

4.12 Air Quality and Noise 2003

There have been no significant changes that would affect air quality or noise levels with the study area.

The same short-term and minor impact of noise and air quality will occur during the dredging operation. There is no change from previous years of dredging.

4.13 Transportation 2003

No significant changes have occurred in the area of transportation that could or would effect the transportation of this area.

4.14 Socio-Economic 2003

The biggest change was the development of new houses or apartments that are open to the public for rental purposes. This would generate income to the Tribe. Fishing is still the main source of revenue for the Tribe.

4.15 Recreation 2003

Fishing is still the main recreation in the project area. There are opportunities to walk on beaches in the area and observe migratory birds. Recreational boating would be predominately for fishing as the entrance to the safety of the marina is still hazardous and takes substantial skills in seamanship to enter this area. Cabins are available for tourist to rent for all the above-mentioned reasons including vacations.

4.16 Aesthetics 2003

The area along the oceanfront has changed to include cabins that are for rental purposes. The aesthetics of a natural area behind the beach has changed to rental cabins. Beach or sand areas that were located on the spit have now become a rocky habitat due to the hardening of the spit to protect the area from the spit breaching and damaging the marina. During low tide the spit has a large beach area that is exposed and usable only during low tides.

5.0 Unavoidable Adverse Effects

The only known unavoidable adverse effect of the maintenance of the Federally Authorized navigation project is the placement of riprap along the entire length of the spit. This was required to stabilize the spit to prevent breaching in the future and to reduce the cost of maintenance of the project.

6.0 Irreversible and Irretrievable Commitments of Resources

No federal resources will be irreversibly and irretrievably committed to the projects until the EA is finalized and the Finding Of No Significant Impact has been signed.

7.0 Cumulative Impacts

With the fact that coastal erosion is occurring all along the Washington Coast the estimated lost of 6.8 acres of beach habitat and the estimated loss of 3.4 acres of beach grass habitat cannot be attributed to the maintenance of the navigation channel entirely. The change in the thalweg of the river the estimated loss of 2.8 acres of sandbar and flats cannot be attributed directly to the maintenance of the navigation channel. What can be attributed to the cumulative impacts is the approximate gain of 7.6 acres of Jetties/dikes and rocky habitat due to the placing of riprap on the spit to stabilize that structure. Of these 7.6 acres a portion could be beach, beach grass, and sandbar/flats type habitat. Although the study in comparison to the 1979-80 studies would indicate there is no impact directly to fisheries there could be indirect impacts to the avian, mammalian, and fisheries populations within the estuary. Those impacts as discussed earlier could be from land use practices such as logging and encroachment or development into riparian areas further upstream from the Quileute Reservation. Those impacts could have changed the thalweg of the river and caused the meandering or loss of landmass that contained habitat for avian, mammalian, and fishery species.

Between 1932 and 1979 the jetty was constructed, boat basin and training wall, dike and numerous methods of anchoring drift logs to the upper spit to prevent breaching was accomplished. All of these construction activities have had permanent impacts to the estuary, mainly in the reduction of area for the benthic community to exist. Some of the construction activities may have had an impact on the thalweg of the river but none of the activities are conclusive with the exception of loss of habitat for benthic communities by building the jetty and dike. However, as the results of the comparison between the 1979-80 study and the study conducted by SAIC 2001 there is a populist benthic community that exist today.

Although the morphology of the Quillayute system has changed dramatically since the 1979-80 study (SAIC 2001), there is no solid evidence that maintenance of the navigation channel has directly affected the estuary with the exception of the above listed gain in rocky habitat. River deposits have changed sides of the river, deep holes have developed that used to be riffles, new side channels have been developed, and sand habitats have developed further down river. These changes can dictate habitat utilization by all species of fish, crab, and benthic invertebrates, and algae. All of these changes could be the result of land use practices that have occurred upstream of the navigation project.

1999

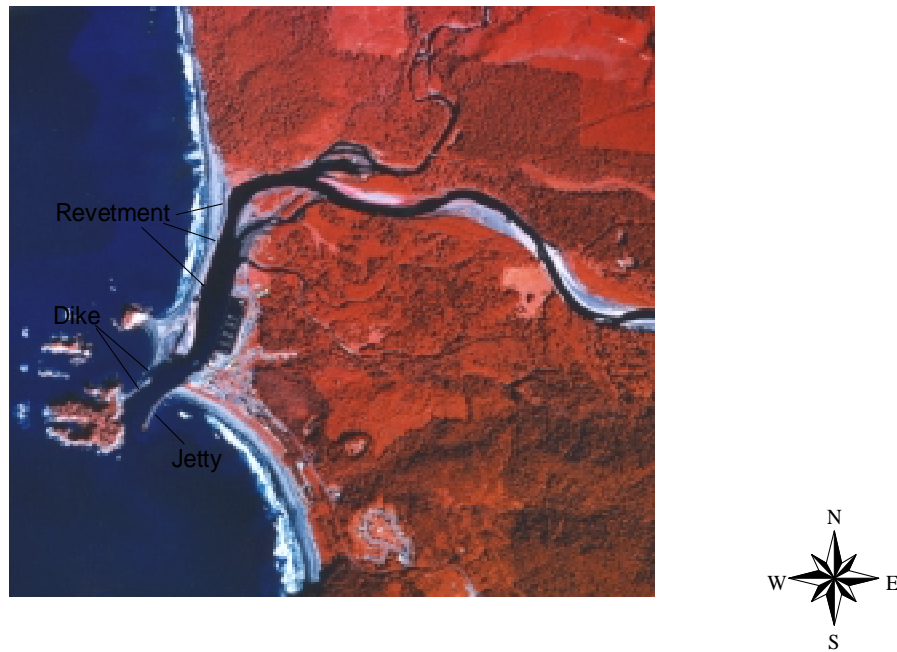


Figure 3. 1999 Aerial Photo

8.0 Recommendations

Based on the review of the two studies one in 1979-80 and the most recent study of 1999-2002, the Corps recommends that the work group described below forms to determine if mitigation of approximately 7.6 acres of habitat should be constructed within the Quillayute Estuary. The type of mitigation that is suggested is habitat that would aid the fisheries of the Quillayute River. It is further recommended that the working group that consisted of the Quileute Tribe, U.S. Fish and Wildlife Service, Environmental Protection Agency, NOAA Fisheries, and the Washington Department of Fish and Wildlife be activated to develop the mitigation plan if so required so the plan can be submitted with the Final Environmental Assessment.

It is also recommended that continued maintenance of the Federal Navigation Channel continue over the next 6 years with the present methodology of dredging.

9.0 Coordination

Coordination will occur with the Quileute Tribe, U.S. Fish and Wildlife Service, Environmental Protection Agency, NOAA Fisheries, and the Washington Department of Fish and Wildlife. This coordination will occur and be documented in the Final Environmental Assessment.

10.0 Environmental Compliance

10.1 National Environmental Policy Act

This Environmental Assessment, prepared August 2004, is a compilation of environmental information on the project related to Quillayute River Navigation Project. A biological assessment is being prepared and will be coordinated with state, federal, and local agencies and will be incorporated as reference in the final environmental assessment.

10.2 Endangered Species Act Section 7 Consultation

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. A Biological Evaluation is being prepared and will be submitted to USFWS and NOAA Fisheries for their concurrence of findings.

10.3 Clean Water Act Compliance

A 404(b)(1) evaluation, which demonstrates compliance with the substantive requirements of the CWA, is required for work involving discharge of fill material into the waters of the United States. Not only will the 404(b)(1) be prepared but also the Corps will seek a 401-water quality certification from EPA on this project.

10.4 Coastal Zone Management Act (CZMA) Consistency Determination (16 USC 1456 et. seq.)

The Federal Navigation Project is located entirely on the Quileute Reservation and dredging will not result in any significant impacts to the State's coastal resources and although not required the Corps will be in compliance with the Washington Coastal Zone Management Program. The Quileute Tribe has a Coastal Zone Management Program that was developed in 1980, updated in 1993, and is consistent with the state's Coastal Zone Management Act; the Corps will be in compliance with the Quileute CZMA.

10.4 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC 470) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. This goal is accomplished through Corps funding of U.S. Fish and Wildlife Service habitat surveys evaluating the likely impacts of proposed actions, which provide the basis for recommendations for avoiding or minimizing such impacts. A Fish and Wildlife Coordination Act Report is not required for maintenance work. However, a Fish and Wildlife Coordination Act Report will be requested for the development of the mitigation site if required as part of this process.

10.5 National Historic Preservation Act

The National Historic Preservation Act (16 USC 470) requires that the effects of proposed undertakings or actions on properties (such as archaeological sites, buildings, structures, or objects) included or eligible for the National Register of Historic Places must be considered. Historic Preservation Officers (HPO) for affected States and Tribes and the Advisory Council on Historic Preservation (ACHP) must be afforded an opportunity to comment on the undertaking, and the agency also must consult with affected Indian tribes. This action was accomplished for the 1986 EIS and since the project has not changed there will be no need to re-consult for the routine maintenance of the navigational channel.

10.6 Executive Order 12898, Environmental Justice

Executive Order 12898 directs every federal agency to identify and address disproportionately high and adverse human health or environmental effects of agency programs and activities on minority and low-income populations.

The potentially affected community does include a minority and/or low-income population.

The project does not involve the sighting of a facility that will discharge pollutants or contaminants, so no human health effects would occur. Maintenance of this structure would not negatively affect property values in the area, or socially stigmatize local residents or businesses in any way. No interference with local Native American Nation's treaty rights would result from the proposed project; construction activities would not physically interfere with fishing (based on negotiations with the Quileute Tribe), or impact fishery resources.

Since no health and few adverse effects will occur from the project, the Corps has determined the overall project benefits the local economy and has determined that no disproportional impacts would occur.

11.0 Conclusion

Based on the above analysis, this project is not a major Federal action significantly affecting the quality of the human or natural environment, and therefore does not require preparation of an environmental impact statement. This determination is based on the working group developing mitigation if required for the impacts associated with the placement of riprap on the spit for stabilization purposes. No other impacts from the maintenance of the Federal Navigation Channel can be directly associated with the project.

12.0 References

Quillayute River Navigation Project Final Environmental Impact Statement 1986
Wildlife Surveys Quillayute Navigational Project 2002
Fish, Crab, and Benthic Studies Quillayute Navigation Project 2003
Water Quality Study Quillayute Navigational Project 2001
Habitat evaluation Quillayute Navigational Project 2001